**Microscope Lab Part 1**

**Purpose**

1. Be able to identify the parts of the microscope and adjust the light.
2. Be able to list the steps in focusing on a slide under scanning power, low power, and high power.
3. Explain how to calculate the total magnification of each objective.
4. Measure the field of view under scanning power using a metric ruler.
5. Calculate the field of view for the low and high power objective.

**Materials**

1. Metric ruler
2. Microscope

**Procedure**

1. Measure the field of view under scanning power using a metric ruler. Complete the data table.

**Data**

1. Complete the following chart:

|  |  |  |  |
| --- | --- | --- | --- |
| Objective | Total magnification | Field of view (mm) | Field of view (um) |
| Scanning (4X) | 4x10= 40 |  |  |
| Low power (10X) |  |  |  |
| High power (40X) |  |  |  |

1 mm = 1,000um

To calculate the field of view for the low and high power objective.

Scanning power magnification = Low power field (mm)

Low power magnification Scanning power field (mm)

Low power magnification = High power field (mm)

High power magnification Low power field (mm)

**Microscope Lab Part 2**

**Purpose**

1. Explain what stains are and why they are often used with biological materials.

2. Draw a cheek cell and identify its nucleus and plasma membrane.

3. Draw an *Elodea* cell and identify the chloroplasts and cell wall.

**Materials**

2 Slides Elodea leaf

2 Cover Slips Water

Tooth pick

Methylene Blue

**Method**

1. Gently scrape some cheek cells from the inside of your cheek with a clean, flat toothpick.

Discard your toothpick immediately after use in the container provided.

2. Spread the scrapings in the middle of a clean slide. Wait until the slide dries before proceeding.

4. Put several drops of methylene blue on the cheek scrapings. Wait 2 minutes for the stain to take effect.

5. *Gently* rinse the methylene blue off the slide with water from a squirt bottle. (If you rinse too vigorously, you may wash the cells off, too.)

6. Use a paper towel to blot dry the bottom of the slide. Do not wipe the top!

7. Add a small drop of water to the cheek scrapings; then add a cover slip.

8. Examine your cheek cells under the compound microscope.

Since the cells are still relatively transparent, adjust the aperture

of the diaphragm to obtain maximum contrast.

9. Sketch the cheek cells in your lab journal and label the plasma membrane and nucleus.

**Plant Cell**

**Procedure**

1. Place one *Elodea* leaf on a slide in a drop of water.

2. Add a cover slip as shown in Figure 4.4. Try to avoid trapping air bubbles on the leaf surface.

3. Focus on the *Elodea* cells at scanning power, then at low power, and finally at high power.

4. With the high-power objective in place, move the fine-focus knob slightly up and down to see the entire thickness of a cell. ***Sketch a few Elodea cells in your lab manual***. Label the cell wall and chloroplasts. (You may not be able to see the nucleus.) In some cells you should be able to see cytoplasmic streaming as the chloroplasts move around the cell on microfilament tracks.

Try to visualize the *Elodea* cell in three dimensions. The cell is shaped like a shoebox, and inside the cell wall is the plasma membrane. A thin layer of cytoplasm lines the cell, but the largest volume is occupied by the central vacuole, which is interior to the cytoplasm. As Figure 4.8 shows, you are looking down on the top of the cell, so your view of the vacuole is blocked by the cytoplasm.

**Discussion Questions/Conclusions**

1. Explain how to calculate:

1. total magnification
2. field of view

2. State the relationship between magnification and field of view.

3. Explain the steps on how to focus a slide.

4. As the magnification increases, the field of view \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.